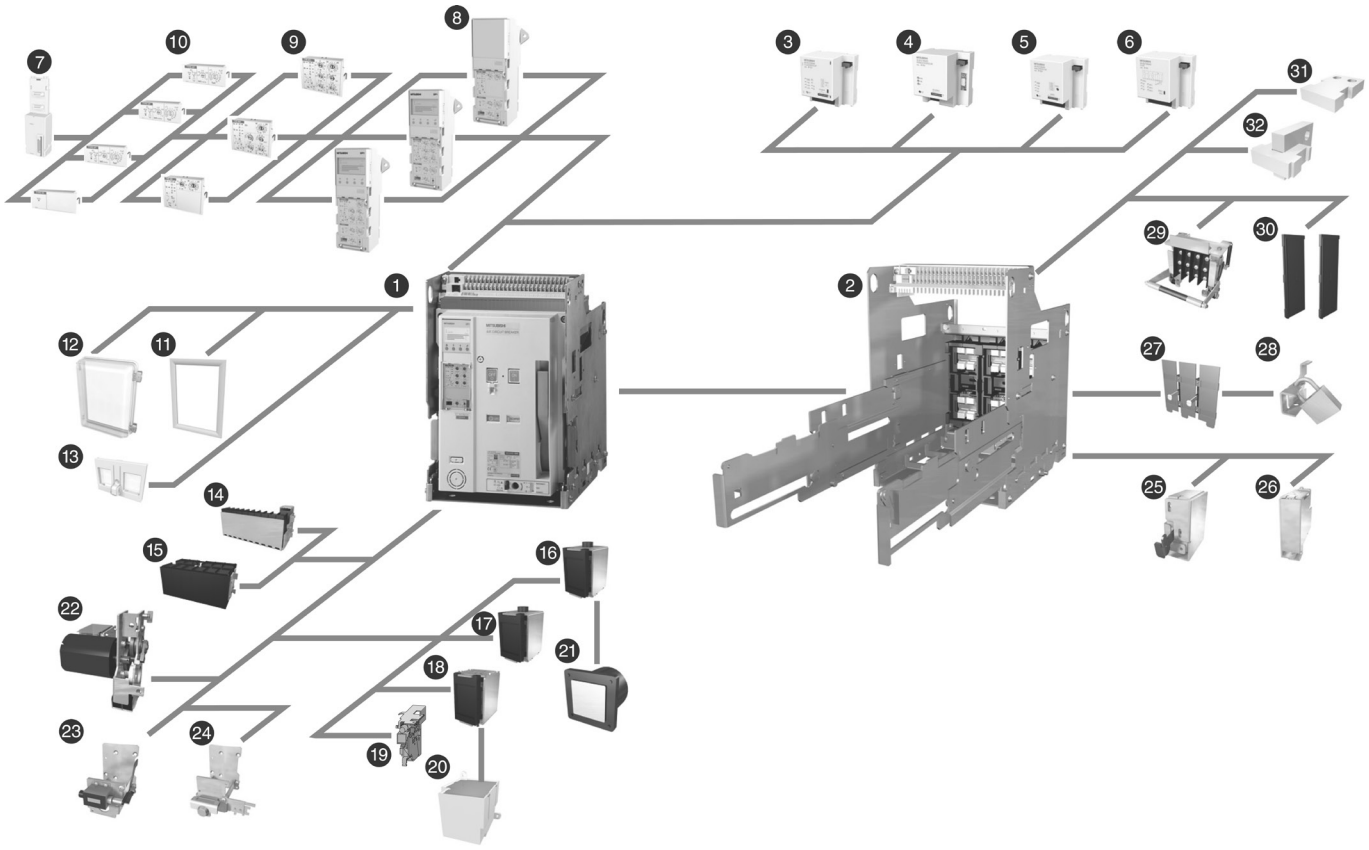
Low Voltage Switchgears

Air Circuit Breakers

- 1 Base Units 4
- 2 Accessories 10
- 3 Electronic Trip Relay 20

Product Skeleton of Accessories for SUPER AE Series Air Circuit Breakers

Mitsubishi Electric offers a wide range of accessories for the Air Circuit Breakers to serve almost all variations of applications.



Position	Name
1	Air circuit breaker
2	Cradle
3	CC-Link® Interface unit
4	PROFIBUS-DP Interface unit
5	MODBUS® Interface unit
6	I/O unit
7	Extension module
8	ETR unit
9	Main setting module
10	Optional setting module
11	Door frame (DF)

Position	Name
12	Dust cover (DUC)
13	Push button cover (BC-L)
14	Auxiliary switch standard (AX)
15	Auxiliary switch high capacity type (HAX)
16	Shunt trip device (SHT)
17	Closing coil (CC)
18	Under voltage trip device (UVT)
19	Trip coil (TC (OCR-Alarm))
20	UVT-controller (U-CON)
21	Condenser trip device (COT)
22	Motor charging device (MD)

Position	Name
23	Counter (CNT)
24	Cylinder lock (CYL)
25	Door interlock (DI)
26	Mechanical interlock (MI)
27	Safety shutters (SST)
28	Safety shutter lock (SST-LOCK)
29	Cell switch (CL)
30	Interphase Barrier (BA)
31	Horizontal terminal
32	Vertical terminal

Product Introduction of Accessories for SUPER AE Series Air Circuit Breakers

1 Type
- AE1000-SW
- AE1250-SW
- AE1600-SW
- AE2000-SWA
- AE2000-SW
- AE2500-SW
- AE3200-SW
- AE4000-SWA
- AE4000-SW
- AE5000-SW
- AE6300-SW

2 Technical standards
- IEC 60947-2
- EN 60947-2 (CE)
- VDE
- JIS C 8201-2-1
- GB 14048.2 (CCC)

Approvals
- LR
- GL
- BV
- DNV
- ABS
- NK

3 Connection
- Drawout type
- Horizontal terminal
- Vertical terminal
- Front terminal

Fixed type

4 Drawout type accessories
- Cell switch
- Shorting b-contact
- Lifting hooks
- Safety shutter
- Safety shutter lock
- Mis-insertion preventor
- Test jumper

5 Electrical accessories
- Auxiliary switch
- Motor charging device
- Closing coil
- Shunt trip device
- Under voltage trip device
- Condenser trip device
- Trip Coil Man./Aut. Reset Type

6 Mechanical accessories
- Push button cover
- Counter
- Cylinder lock
- Terminal cover
- Door frame
- Dust cover
- Interphase barrier
- Mechanical interlock
- Door interlock

7 Electronic trip relay

General use
WS type

Generator protection use
WM type

On request:
Special use
WB type

Optional
G1: Ground fault protection
E1: Earth leakage protection
AP: 2nd Additional Pre-alarm
N5: Neutral pole 50 % protection

8 Relay accessories
- Extension module
- Display
- MCR switch
- Neutral CT
- External ZCT
- VT-W unit

9 Network
- CC-Link® Interface unit
- PROFIBUS/DP Interface unit
- MODBUS® Interface unit
- I/O unit

10 Special environment
- Moisture-fungus treatment
- Corrosion resist

For details on our full range including accessories contact your local distributor

Specifications

SUPER AE – WORLD SUPER SERIES			Breaker type	AE 1000- SW		AE 1250- SW		AE 1600 -SW		AE 2000- SWA	
Frame size			A	1000		1250		1600		2000	
Rated insulation voltage (AC V) 50/60 Hz			U_i	1000							
Rated operating voltage (AC V) 50/60 Hz			U_e	690							
Rated impulse withstand voltage (kV)			U_{imp}	12							
Pollution degree				3							
Number of poles			P	3	4	3	4	3	4	3	4
Rated current In (CT rating)				1000		1250		1600		2000	
Adjustment range Rated current (A) Ir		General use (current rating adjustable 0.5 to 1.0 x In 0.05 step)		500-550-600-650-700-750-800-850-900-950 -1000		625-687.5-750-812.5-875-937.5-1000-1062.5-1125-1187.5-1250		800-880-960-1040-1120-1200-1280-1360-1440-1520-1600		1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000	
		Generator protection (current rating fixed)		400 ≤ Ir ≤ 1000		800 ≤ Ir ≤ 1250		1000 ≤ Ir ≤ 1600		1250 ≤ Ir ≤ 2000	
Rated current of neutral pole			(A)	1000		1250		1600		2000	
IEC 60947-2, EN 60947-2, VDE, JIS C 8201-2-1	Ultimate breaking capacity Icu (kA rms)		690 V AC	65		65		65		65	
			600 V AC	65		65		65		65	
			240 – 500 V AC	65		65		65		65	
		With MCR	690 V AC	65		65		65		65	
			600 V AC	65		65		65		65	
			240 – 500 V AC	65		65		65		65	
		Without instantaneous	690 V AC	25 ①		25 ①		25 ①		25 ①	
			500 V AC	25 ①		25 ①		25 ①		25 ①	
	Rated service breaking capacity Ics (kA rms) % Icu										
	Rated making capacity Icm (kA, peak)		690 V AC	143		143		143		143	
			600 V AC	143		143		143		143	
		240 – 500 V AC		143		143		143		143	
		With MCR	690 V AC	143		143		143		143	
			600 V AC	143		143		143		143	
			240 – 500 V AC	143		143		143		143	
		Without instantaneous	690 V AC	52.5		52.5		52.5		52.5	
			500 V AC	52.5		52.5		52.5		52.5	
Disconnector: switching capacity (6 x Ir at 690V AC)				○		○		○		○	
Rated short time withstand current (kA rms) Icw			1s	65		65		65		65	
			2s	60		60		60		60	
			3s	50		50		50		50	
Maximum total breaking time			(ms)	40 ⑥		40 ⑥		40 ⑥		40 ⑥	
Closing time			(ms)	80		80		80		80	
Number of operating cycles (ON/OFF)		With rated current	500 V AC In	5000		5000		5000		1500	
			690 V AC In	5000		5000		5000		1500	
		Without rated current		25000		25000		25000		25000 ④	
Connecting terminal		Horizontal terminal		○		○		○		—	
		Vertical terminal		○		○		○		○ ③	
		Front terminal		○		○		○		—	
Dimensions (H x W x D mm)		Fixed type	3-pole	410 x 340 x 290							
			4-pole	410 x 425 x 290							
		Drawout type	3-pole	430 x 300 x 368							
			4-pole	430 x 385 x 368							
Weight (kg)		Fixed type	3-pole	41		41		42		47	
			4-pole	51		51		52		57	
		Drawout type (with cradle)	3-pole	64		64		65		70	
			4-pole	78		78		79		84	
		Cradle only	3-pole	26		26		26		31	
			4-pole	30		30		30		35	

① The columns for "without instantaneous" are the values when the bare main body and the external relay is combined.

② The number of operating cycles without rated current also include the number of operating cycles with rated current.

③ AE4000-SW, AE5000-SW, AE6300-SW, AE2000-SWA and AE4000-SWA apply for only vertical terminal of connecting terminal.

④ This value means number of operating cycles of ACB's body not including accessories.

⑤ Products with low rating types is available.

AE 2000- SW		AE 2500- SW		AE 3200- SW		AE 4000- SWA		AE 4000- SW		AE 5000- SW		AE 6300- SW	
2000		2500		3200		4000		4000		5000		6300	
1000										1000			
690										690			
12										12			
3										3			
3	4	3	4	3	4	3	4	3	4(HN, FN) ⑦	3	4(HN, FN) ⑦	3	4(HN, FN) ⑦
2000		2500		3200		4000		4000		5000		6300	
1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000 ⑤		1250-1375-1500-1625-1750-1875-2000-2125-2250-2375-2500		1600-1760-1920-2080-2240-2400-2560-2720-2880-3040-3200		2000-2200-2400-2600-2800-3000-3200-3400-3600-3800-4000		2000-2200-2400-2600-2800-3000-3200-3400-3600-3800-4000		2500-2750-3000-3250-3500-3750-4000-4250-4500-4750-5000		3150-3465-3780-4095-4410-4725-5040-5355-5670-5985-6300	
800 ≤ Ir ≤ 2000		1600 ≤ Ir ≤ 2500		2000 ≤ Ir ≤ 3200		2500 ≤ Ir ≤ 4000		2500 ≤ Ir ≤ 4000		3150 ≤ Ir ≤ 5000		4000 ≤ Ir ≤ 6300	
2000		2500		3200		4000		2000 (4000) h		2500 (5000) h		3150 (6300) h	
75		75		75		75		85		85		85	
75		75		75		75		85		85		85	
85		85		85		85		130		130		130	
75		75		75		75		85		85		85	
75		75		75		75		85		85		85	
75		75		75		75		100		100		100	
45 ①		45 ①		45 ①		45 ①		65 ①		65 ①		65 ①	
45 ①		45 ①		45 ①		45 ①		65 ①		65 ①		65 ①	
100%										100%			
165		165		165		165		187		187		187	
165		165		165		165		187		187		187	
187		187		187		187		286		286		286	
165		165		165		165		187		187		187	
165		165		165		165		187		187		187	
165		165		165		165		220		220		220	
94.5		94.5		94.5		94.5		143		143		143	
94.5		94.5		94.5		94.5		143		143		143	
○		○		○		○		○		○		○	
75		75		75		75		100		100		100	
75		75		75		75		85		85		85	
65		65		65		65		85		85		85	
40 ⑥		40 ⑥		40 ⑥		40 ⑥		50 ⑥		50 ⑥		50 ⑥	
80		80		80		80		80		80		80	
1500		1500		1000		500		1000		1000		1000	
1500		1500		1000		500		1000		1000		1000	
20000		20000		20000		20000		10000 (3P) / 5000 (4P)		10000 (3P) / 5000 (4P)		10000 (3P) / 5000 (4P)	
○		○		○		—		—		—		—	
○		○		○		○ ③		○ ③		○ ③		○ ③	
○		○		○		—		—		—		—	
410 x 475 x 290										414 x 873 x 290			
410 x 605 x 290										414 x 1003 (1133) x 290 ⑧			
430 x 435 x 368						430 x 439 x 368		480 x 875 x 368					
430 x 565 x 368						430 x 569 x 368		480 x 1005 (1135) x 368 ⑧					
60	368	61	368	63		81		160		160		160	
72	75	73	99	75		99		180 (200) ⑧		180 (200) ⑧		180 (200) ⑧	
92	78	93	103	95		108		233		233		240	
113	116	114	136	116		136		256 (279) ⑧		256 (279) ⑧		263 (286) ⑧	
35	119	35	140	35		49		118		118		125	
43	44	43	61	43		61		133 (148) ⑧		133 (148) ⑧		140 (155) ⑧	

⑥ This value means the instantaneous breaking time at short-circuit interruption. As for accessories (SHT, UVT) refer to page 12 and 13.

⑦ 4 (HN) means the neutral poles current capacity is 50% of the rated current, for 4-poles.
4 (FN) means the neutral poles current capacity is 100% of the rated current, for 4-poles.

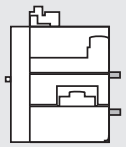
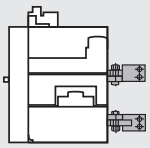
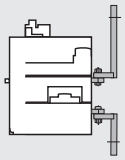
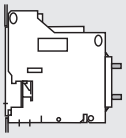
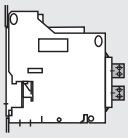
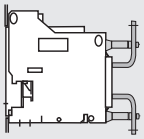
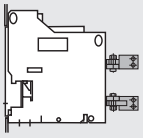
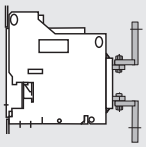
⑧ () shows the value for 4P FN type.

Remarks:
– All models conform the isolating function according to IEC 60947-2.
– Reverse connection is possible

Connections

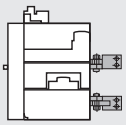
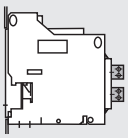
Connection arrangements

The following connecting methods are available for the **AE1000-SW – AE3200-SW.**

Connection / Mounting method	Horizontal connection Standard	Vertical connection Optional	Front connection Optional	Vertical terminal adapter Accessory	Front terminal adapter Optional
Fixed type	 (Standard)	—	—	 (FIX-VTA)	 (FIX-FTA)
Drawout type	 (Standard)	 (DR-VT)	 (DR-FT)	 (DR-VTA)	 (DR-FTA)
Remark	Standard equipment (shipping version)	Special equipment (on request)	Special equipment (on request)	Available as accessory (refer to page 15)	Optional accessory (on request)

Connection image: AE1000 – 1600-SW, 3-pole type
Standard Fixed type breakers AE1000/1250/1600/2000/2500/3200-SW are also available as Drawout type. Please order the corresponding cradle with the drawout mechanism (see table on next page)

The following connecting methods are available for the **AE2000-SWA**, **AE4000-SWA** and **AE4000-SW – AE6300-SW.**

Connection / Mounting method	Vertical connection Standard
Fixed type	 (FIX-VT)
Drawout type	 (DR-VT)
Remark	Special equipment (on request)

Connection image: AE2000-SWA, 3-pole type
For AE2000-SWA, AE4000-SWA, AE4000-SW, AE5000-SW and AE6300-SW models, vertical terminal **only** is available.

Available Connections

Connections / Breakers		A1000-SW	AE1250-SW	AE1600-SW	AE2000-SWA	AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA	AE4000-SW	AE5000-SW	AE6300-SW
Fixed type (FIX)	**Horizontal**	●	●	●	—	●	●	●	—	—	—	—
	FIX-VT	—	—	—	●	—	—	—	●	●	●	●
	FIX-VTA	○	○	○	—	○	○	○	—	—	—	—
	FIX-FTA	○	○	○	—	○	○	○	—	—	—	—
Drawout type (DR)	**Horizontal**	●	●	●	—	●	●	●	—	—	—	—
	DR-VT	○	○	○	●	○	○	○	●	●	●	●
	DR-FT	○	○	○	—	○	○	○	—	—	—	—
	DR-VTA	○	○	○	—	○	○	○	—	—	—	—
	DR-FTA	○	○	○	—	○	○	○	—	—	—	—

● Standard ○ Option — Not available

Order information – Air circuit breakers

Standard series AE-SW – Fixed type

Base unit equipment	Breaker	3-pole type	Art. no.	4-pole type	Art. no.
Shipping contents: ● Electronic trip Relay base unit ● Power supply PW3 ● 10 auxiliary contacts (5 NO, 5 NC contacts) ● Automatic reset type trip coil (TCA-AL-W) Further elements that must be ordered: ○ Main setting module for protection ○ Accessories as required	AE1000-SW	AE1000-SW 3P Fix, ETRBASE-P3, AX10	168373	AE1000-SW 4P Fix, ETRBASE-P3, AX10	168434
	AE1250-SW	AE1250-SW 3P Fix, ETRBASE-P3, AX10	168435	AE1250-SW 4P Fix, ETRBASE-P3, AX10	168436
	AE1600-SW	AE1600-SW 3P Fix, ETRBASE-P3, AX10	168437	AE1600-SW 4P Fix, ETRBASE-P3, AX10	168438
	AE2000-SW	AE2000-SW 3P Fix, ETRBASE-P3, AX10	168443	AE2000-SW 4P Fix, ETRBASE-P3, AX10	168444
	AE2500-SW	AE2500-SW 3P Fix, ETRBASE-P3, AX10	168445	AE2500-SW 4P Fix, ETRBASE-P3, AX10	168446
	AE3200-SW	AE3200-SW 3P Fix, ETRBASE-P3, AX10	168447	AE3200-SW 4P Fix, ETRBASE-P3, AX10	168448

Cradle with the drawout mechanism

	Cradle	For type	Art. no.
	CRD163-W	Draw Out type AE1000-AE1600 3P	170078
	CRD164-W	Draw Out type AE1000-AE1600 4P	170079
	CRD323-W	Draw Out type AE2000-AE3200 3P	170080
	CRD324-W	Draw Out type AE2000-AE3200 4P	170081
	REC-FD-W	Drawout mechanism with drawout handle	169004

Air circuit breaker series AE-SWA

Base unit equipment	Breaker	Fixed type	Art. no.	Draw-out type	Art. no.
Shipping contents: ● Electronic trip Relay base unit ● Power supply PW3 ● 10 auxiliary contacts (5 NO, 5 NC contacts) ● Automatic reset type trip coil (TCA-AL-W) Further elements that must be ordered: ○ Main setting module for protection ○ Accessories as required	AE2000-SWA	AE2000-SWA 3P Fix, ETRBASE-P3, AX10	168439	AE2000-SWA 3P D/O, ETRBASE-P3, AX10	168441
	AE2000-SWA	AE2000-SWA 4P Fix, ETRBASE-P3, AX10	168440	AE2000-SWA 4P D/O, ETRBASE-P3, AX10	168442
	AE4000-SWA	AE4000-SWA 3P Fix, ETRBASE-P3, AX10	168449	AE4000-SWA 3P D/O, ETRBASE-P3, AX10	168451
	AE4000-SWA	AE4000-SWA 4P Fix, ETRBASE-P3, AX10	168450	AE4000-SWA 4P D/O, ETRBASE-P3, AX10	168452

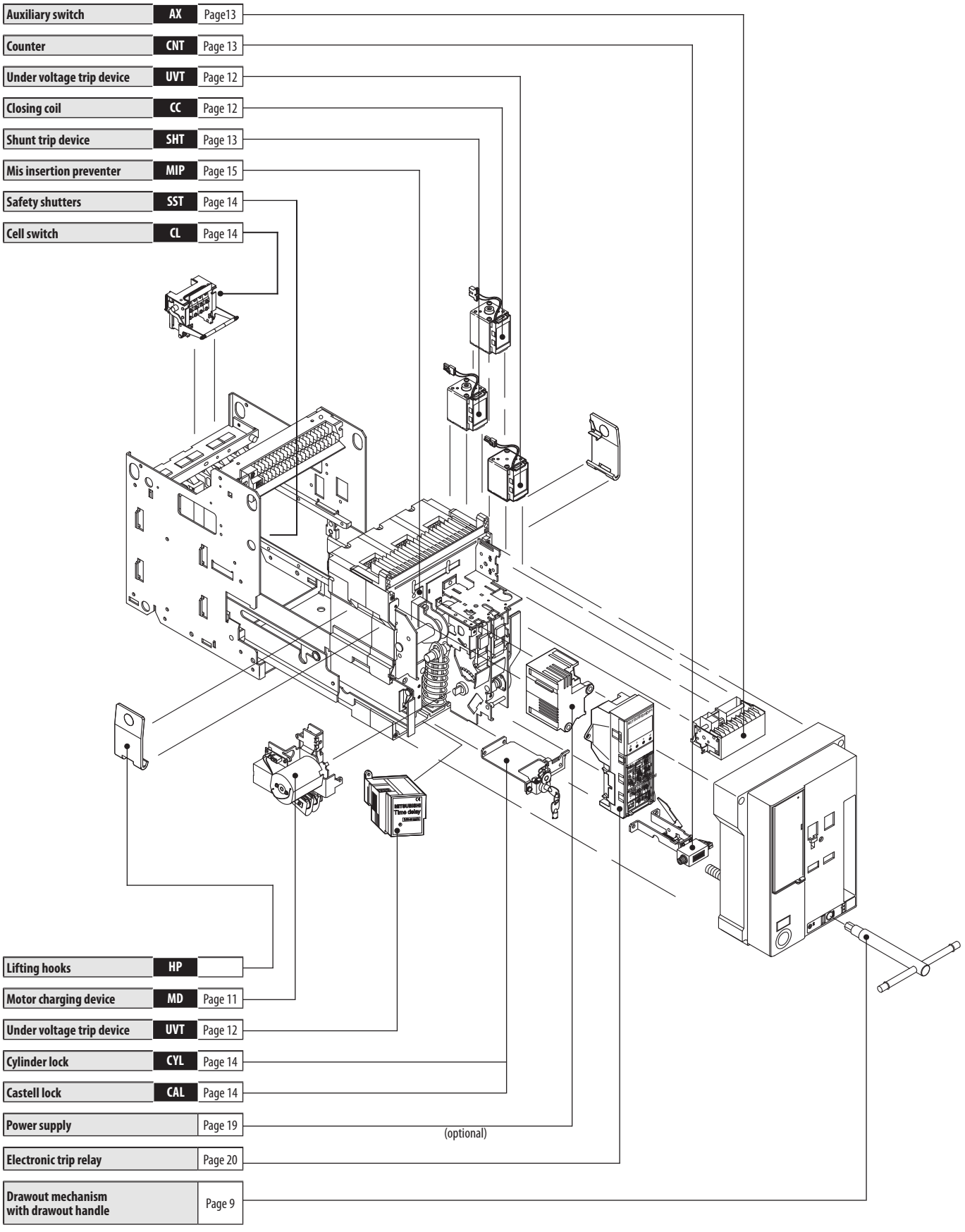
Air circuit breaker series AE4000 – 6300-SW – Fixed / Drawout type

Base unit equipment	Breaker	Fixed type 3/4-pole	Art. no.	Draw-out type 3/4-pole	Art. no.
Shipping contents: ● Electronic trip Relay base unit ● Power supply PW3 ● 10 auxiliary contacts (5 NO, 5 NC contacts) ● Automatic reset type trip coil (TCA-AL-W) Further elements that must be ordered: ○ Main setting module for protection ○ Accessories as required	AE4000-SW	AE4000-SW 3P Fix, ETRBASE-P3, AX10	205144	AE4000-SW 3P D/O, ETRBASE-P3, AX10	205153
	AE5000-SW	AE5000-SW 3P Fix, ETRBASE-P3, AX10	205145	AE5000-SW 3P D/O, ETRBASE-P3, AX10	205154
	AE6300-SW	AE6300-SW 3P Fix, ETRBASE-P3, AX10	205146	AE6300-SW 3P D/O, ETRBASE-P3, AX10	205155
	AE4000-SW HN	AE4000-SW HN 4P Fix, ETRBASE-P3, AX10	205147	AE4000-SW HN 4P D/O, ETRBASE-P3, AX10	205156
	AE4000-SW FN	AE4000-SW FN 4P Fix, ETRBASE-P3, AX10	205148	AE4000-SW FN 4P D/O, ETRBASE-P3, AX10	205157
	AE5000-SW HN	AE5000-SW HN 4P Fix, ETRBASE-P3, AX10	205149	AE5000-SW HN 4P D/O, ETRBASE-P3, AX10	205158
	AE5000-SW FN	AE5000-SW FN 4P Fix, ETRBASE-P3, AX10	205150	AE5000-SW FN 4P D/O, ETRBASE-P3, AX10	205159
	AE6300-SW HN	AE6300-SW HN 4P Fix, ETRBASE-P3, AX10	205151	AE6300-SW HN 4P D/O, ETRBASE-P3, AX10	205160
	AE6300-SW FN	AE6300-SW FN 4P Fix, ETRBASE-P3, AX10	205152	AE6300-SW FN 4P D/O, ETRBASE-P3, AX10	205161

Switch-disconnector AE-SW – Fixed / Drawout type

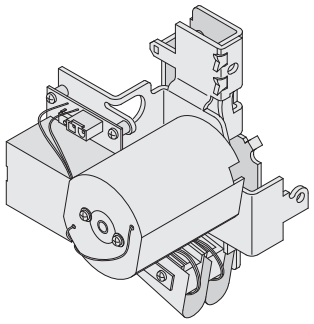
Base unit equipment	Breaker	3-pole type	Art. no.	4-pole type	Art. no.
Shipping contents: ● 10 auxiliary contacts (5 NO, 5 NC contacts) ● Switching capacity I_{Rx6} Further elements that must be ordered: ○ Accessories as required	AE1000-SW	AE1000-SW 3P Fix, Bare, AX10	193919	AE1000-SW 4P Fix, Bare, AX10	193920
	AE1250-SW	AE1250-SW 3P Fix, Bare, AX10	193921	AE1250-SW 4P Fix, Bare, AX10	193922
	AE1600-SW	AE1600-SW 3P Fix, Bare, AX10	193923	AE1600-SW 4P Fix, Bare, AX10	193924
	AE2000-SW	AE2000-SW 3P Fix, Bare, AX10	193929	AE2000-SW 4P Fix, Bare, AX10	193930
	AE2500-SW	AE2500-SW 3P Fix, Bare, AX10	193931	AE2500-SW 4P Fix, Bare, AX10	193932
	AE3200-SW	AE3200-SW 3P Fix, Bare, AX10	193933	AE3200-SW 4P Fix, Bare, AX10	193934
	AE2000-SWA	AE2000-SWA 3P Fix, Bare, AX10	193925	AE2000-SWA 4P Fix, Bare, AX10	193926
	AE4000-SWA	AE4000-SWA 3P Fix, Bare, AX10	193935	AE4000-SWA 4P Fix, Bare, AX10	193936
	AE2000-SWA	AE2000-SWA 3P D/O, Bare, AX10	193927	AE2000-SWA 4P D/O, Bare, AX10	193928
	AE4000-SWA	AE4000-SWA 3P D/O, Bare, AX10	193937	AE4000-SWA 4P D/O, Bare, AX10	193938

Overview and mounting positions of the main accessories


Auxiliary switch AX Page13
Counter CNT Page 13
Under voltage trip device UVT Page 12
Closing coil CC Page 12
Shunt trip device SHT Page 13
Mis insertion preventer MIP Page 15
Safety shutters SST Page 14
Cell switch CL Page 14
Lifting hooks HP
Motor charging device MD Page 11
Under voltage trip device UVT Page 12
Cylinder lock CYL Page 14
Castell lock CAL Page 14
Power supply Page 19
(optional)
Electronic trip relay Page 20
Drawout mechanism with drawout handle Page 9

Overview and description on the optional accessories

■ Motor charging device (MD)



In addition to manual operation, the closing spring can be charged automatically by an electric motor every time the breaker is closed (ON charging method).

If the closing spring is to be charged automatically whenever the breaker is opened, then this can be done through an additional auxiliary contact (AXb) (OFF charging method). As soon as charging is completed, a visual display on the front says "CHARGED".

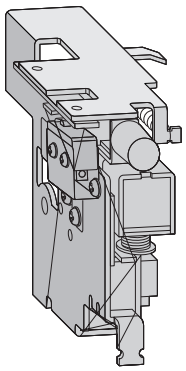
The "CHARGED" signal is also available via the 413 (TS+) and 414 (TS-) terminals (included in the standard MD configuration).

There is always the option of manual operation in an emergency. A closing coil (CC) is required for closing the breaker by remote control, and a shunt trip device (SHT) is required for opening it in this way.

This warrants the prevention of pumping, both electronically and mechanically. The circuit of the motor is separate from the ON/OFF circuit (CC, SHT).

Specifications		MD-AD125-W	MD-AD250-W	MD-AD125-4A4W-W	MD-AD250-4A4W-W	MD-D024-W	MD-D048-W
Rated voltage		100 – 125 V AC/DC	200– 250 V AC/DC	100 – 125 V AC/DC	200– 250 V AC/DC	24 V DC	48 V DC
Applicable voltage range	(V)	85 – 137.5	170 – 275	85 – 137.5	170 – 275	18 – 26.4	36 – 52.8
Applied voltage	(V)	100 / 125	200 / 250	100 / 125	200 / 250	24 V	48 V
Inrush current (peak value)	(A)	10 / 12	5 / 6	10 / 12 12	7 / 8	22	14
Steady current	(A)	3	1	4	2	6	3
Charging time	(sec)	≤5	≤5	≤5	≤5	≤5	≤5
Criterion for power requirement	(VA)	700 / 1000	700 / 1000	700 / 1000	700 / 1000	500	500
Order information	Art. no.	168514	168515	168516	168517	168518	168519

■ Trip coil (AL)



Automatic reset type (TCA-AL-W)

OCR alarm (AL) is provided as standard if ETR is equipped. OCR alarm (AL) is the contact (1a) of short-time operation (30 ms), being output when the breaker is tripped by the electronic trip relay.

Two types of automatic reset type (standard) and manual reset type (optional) are available. When ordering, specify either.

Manual reset type (TCM-AL-W)

On the manual reset type (optional), the gray manual reset button will stick out to continuously output OCR alarm (AL) if the breaker is tripped by the electronic trip relay. After tripping, the breaker can not be turned on unless the manual reset button on the front side of the breaker is pressed for resetting.

Specifications		TCA-AL-W	TCM-AL-W
Voltage	AC (V)	125 / 240	125 / 240
	DC (V)	30 / 125 / 240	30 / 125 / 240
Resistive load	AC (A)	5 / 3	5 / 3
	DC (A)	4 / 0.4 / 0.2	4 / 0.4 / 0.2
Inductive load	AC (A)	3 / 2	3 / 2
	DC (A)	3 / 0.4 / 0.2	3 / 0.4 / 0.2
Order information	Art. no.	168535 (standard)	168536

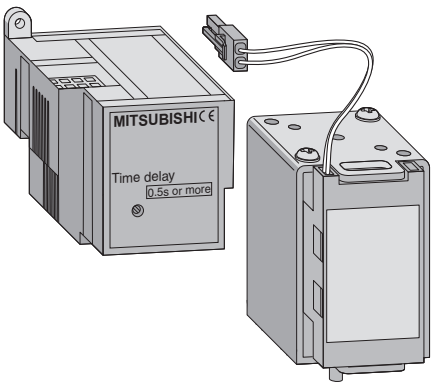
Notes:

– Though the control power supply is unnecessary to activate OCR alarm (AL), the self-holding circuit is necessary since the contact output is activated for the short time (30 ms).

– This works when tripping occurs in LTD, STD, INST, GFR or ER.

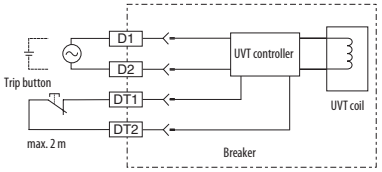
– If any continuous output of OCR alarm (AL) is necessary, use the trip indicator (TI) output contact of the electronic trip relay.

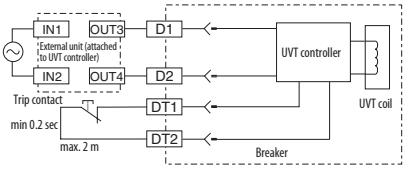
■ Undervoltage trip device (UVT)



This is the device that automatically trips the breaker when the circuit voltage drops below the nominal voltage, and comprises a UVT coil and UVT controller.

Time range for tripping time:
INST (0.2 sec or less)/0.25 sec/0.5 sec/ 0.8 sec/1.0 sec/1.5 sec/3 sec.

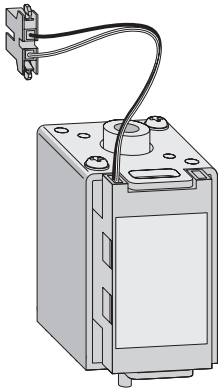


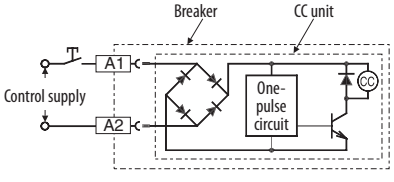


Specifications		UCON-D024B-W INST	UCON-D048B-W INST	UCON-D110B-W INST	UCON-D125B-W INST	UCON-D250B-W INST	UCON-A120B-W INST	UCON-A240B-W INST	UCON-A460B-W INST
Rated voltage	(V)	24 (DC)	48 (DC)	100–110 (DC)	120–125 (DC)	220–250 (DC)	100–120 (AC)	200–240 (AC)	380–460 (AC)
Frequency		—					50/60 Hz		
Operating time (time delay)		☐ INST (0.2 sec); ☐ 0.25 sec ; ☐ 0.5 sec ; ☐ 0.8 sec ; ☐ 1.0 sec ; ☐ 1.5 sec ; ☐ 3.0 sec							
Pick-up voltage	(V)	15.6 – 20.4	31.2 – 40.8	65 – 85	78 – 102	143 – 187	65 – 85	130 – 170	247 – 323
Drop-out voltage	(V)	10.8 – 16.8	21.6 – 33.6	45 – 70	54 – 84	99 – 154	45 – 70	90 – 140	171 – 260
Trip function		With open circuit of DT1, DT2 terminals							
Power consumption	(VA)	20							
Order information	Art. no.	203341	203342	203343	203344	203345	203346	203347	203348
Accessories		UVT coil: art. no. 168525; UCON label: art. no. 168526 (Packing unit: 10 pcs)							

Notes:
– Please order for each UCON one UVT coil, and for delay setting one UCON lable.
– In case of 380–460V AC, the external unit is attached.
– The operating time is a guarantee value when it drops from 85 % or more of rated voltage.
– Time delay should be allowed for 1.5 s between applying the voltage to the UVT and closing the breaker.
– If a remote trip function is required, remove the shorting bar (DT1 – DT2) and connect a normally closed switch, rated 0.5 A at 150 V DC across them.
– Usage ambient temperature is a range of max. 40 °C to -5 °C.

■ Closing coil (CC)





Diode rectifier is not used for control source 24 – 48 V DC.

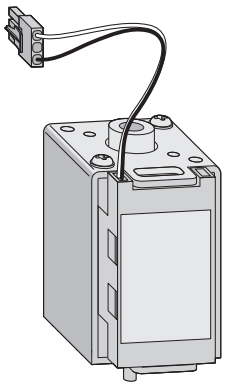
The closing coil is a device to close the breaker by remote control. Only one closing signal (about 100 msec.) is sent even when the closing coil supply is maintained ON.

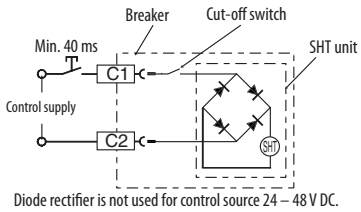
- An interlock to prevent pumping is provided electrically.
- Closing time is from the initial energization of the closing coil to the completion of the closing of the main contacts.
- As CC is one-pulse driven, it is not necessary to insert AXb for burning prevention purposes. Inserting AXb will cause anti-pumping function to be ineffective.

Specifications		CC-D048-W	CC-AD250-W
Rated voltage	(V)	24–48 DC	100–250 AC/DC
Applicable voltage range	(V)	18–52.8	75–275
Operating voltage	(V)	24 / 48	100 / 250
Inrush current	AC (A)	—	0.7 / 1.7 (AC 100 V 100 VA, AC 250 V 200 VA)
	DC (A)	3 / 6 (DC 24 V 100 W, DC 48 V 200 W)	0.8 / 1.8 (DC 100 V 100 W, DC 250 V 200 W)
Closing time ①	(sec)	max. 0.08 or less	max. 0.08 or less
Order information	Art. no.	168521	168520

① In case of double rating of rated voltage, it is the value to the lower rating.
Example: In case of DC 24 to 48, it is operating time to DC 24 V.

■ Shunt trip device (SHT)





Diode rectifier is not used for control source 24 – 48 V DC.

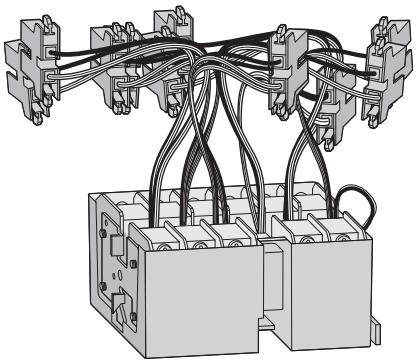
The shunt trip device is used to open the breaker by remote control.

A cut-off switch is included (AX /HAX).

Specifications		SHT-D048-W	SHT-A500-W	SHT-AD250-W
Rated voltage	(V)	24–48 DC	380–500 AC	100–250 (AC/DC)
Applicable voltage range	(V)	16.8–52.8	266–550	70–275
Operating voltage	(V)	24 / 48	380–500	100 / 250
Inrush current (peak value)	AC (A)	—	0.5 / 0.7 (AC 380 V 250 VA, AC 500 V 300VA)	0.4/ 1.4 (AC 100 V 100 VA, AC 250 V 150 VA)
	DC (A)	2.5 / 6.0 (DC 24 V 100 W, DC 48 V 200 W)	—	0.6 / 1.6 (DC 100 V 100 W, DC 250 V 200 W)
Closing time ①	(sec)	max. 0.04 or less	max. 0.04 or less	max. 0.04 or less
Order information	Art. no.	168524	168523	168522

① In case of double rating of rated voltage, it is the value to the lower rating.
Example: In case of DC 24 to 48, it is operating time to DC 24 V.

■ Auxiliary switch (AX, HAX)

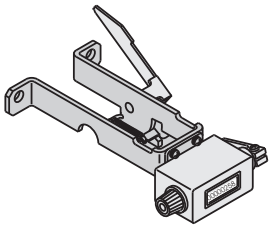


This is the contact that is used to remotely indicate the ON or OFF status of the breaker.

- The a and b contacts may turn simultaneously to ON instantaneously at the time of changing the contact; Pay attention to the contact state when designing circuits.
- The chattering time at the time of contact ON-OFF is below 0.025 sec.
- For special environment specification, the contact capacity gets deteriorated. Apply for further detail.

Specifications		AX-10-W		HAX-10-W	
Load		Resistance	Inductive	Resistance	Inductive
Contact capacity (A)	AC 460 V	5	2	5	2.5
	AC 250 V	10	10	10	10
	AC 125 V	10	10	10	10
	DC 250 V	0.3	0.3	3	1.5
	DC 125 V	0.6	0.6	10	6
	DC 30 V	10	6	10	10
Maximum number of contacts		5a5b		5a5b	
Order information	Art. no.	168962 (standard)		168961	

■ Counter (CNT)

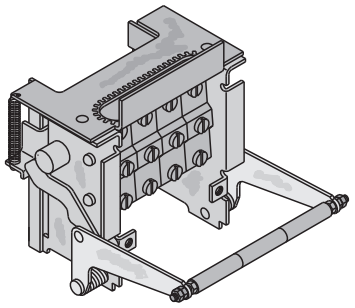


This is a mechanical counter which registers the total number of operating cycles (with 1 ON/OFF switching operation = 1 operating cycle).

The number of operating cycles is displayed on the front of the unit.

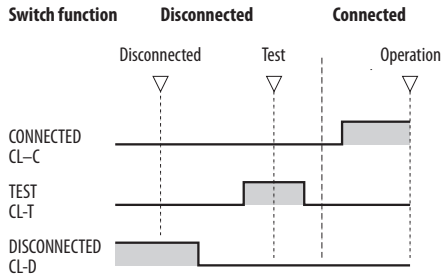
Specifications		CNT-W
Counter type		Mechanical
Display		5 digits
Order information	Art. no.	168538

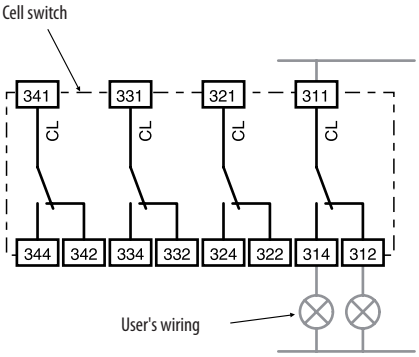
■ Cell switch (CL)



The cell switches can be set for all the relevant positions, i.e. connected, test and disconnected.

Each cell switch consists of 4 individual switches.

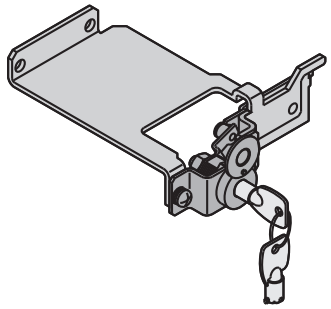




Specifications		CL-4-W		BIF-CL-W ①	
Load		Resistive	Inductive	Resistive	Inductive
Contact capacity (A)	AC 460 V	5	2.5	5	2.5
	AC 250 V	10	10	10	10
	AC 125 V	10	10	10	10
	DC 250 V	3	1.5	3	1.5
	DC 125 V	10	6	10	6
	DC 30 V	10	10	10	10
Maximum contacts		Total 4c			
Order information	Art. no.	168512		168575	

① BIF-CL only necessary for networks operation

■ Interlock device (CYL)



The interlock device locks the circuit breaker into the OFF position.

The relevant key can only be taken out in the OFF position of the circuit breaker, so that it can also be used for unlocking other breakers.

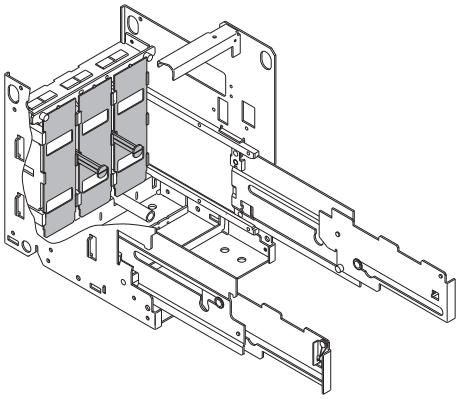
There are two locking options available:

- Cylinder lock (CYL)
- Castell lock (CAL) a

Specifications		CYL-WK-W	CYL-WK1-W	CYL-WK2-W	CYL-WK3-W	CYL-WK4-W	CYL-NK-W
Interlock		Cylinder	Cylinder	Cylinder	Cylinder	Cylinder	Castell ①
Closing		Basic	1	2	3	4	Basic
Order information	Art. no.	168539	168540	168541	168542	168543	168544

① The closing basis for the Castell lock can be designed individually. Further details on request.

■ Safety shutters (SST)



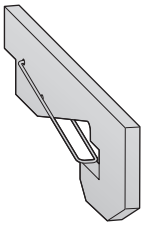
The safety shutters cover the main conductors of the cradle side (supply and load side) automatically when the circuit breaker is drawn out.

When checking the main circuit, the safety shutters on the supply and load sides can be opened independently of one another.

The safety shutters can also be locked with a mechanical locking device (SST LOCK). The padlocks have to be supplied by customer.

Specifications		SST-LOCK-W	SST-203-W	SST-204-W	SST-403-W	SST-404-W
Breaker type		Drawout				
Number of poles		3/4	3	4	3	4
Order information	Art. no.	168510	168973	168974	168975	168976

■ Vertical terminal adapter (VTA)

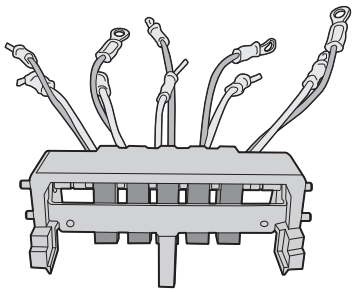


To obtain the right draw out configuration, it is extremely important that the breaker unit specifications (type, current rating, optional accessories, etc.) should match the cradle.

Mis-insertion is prevented by a combination of matching components (on the breaker and the cradle).

Specifications	MIP-W
Material	Metal
Order information Art. no.	168547

■ Shorting b-contact (SBC)

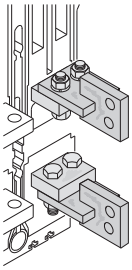


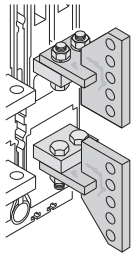
SBC-5-W

When moving the breaker from the connected to the test positions, this contact is used to short circuit auxiliary switch (Axb) thus maintaining the correct sequence of operation of the external control circuit.

Specifications	SBC-1-W	SBC-2-W	SBC-3-W	SBC-4-W	SBC-5-W
Number of contacts	1	2	3	4	5
Application (breaker)	All breakers				
Order information Art. no.	168548	202337	202338	202339	202340

■ Vertical terminal adapter (VTA)



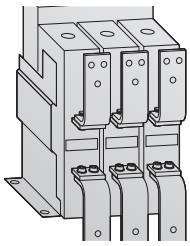


Vertical terminal adapters allow you to turn power connection by 90°.

For AE2000-SWA, AE4000-SWA, AE4000-SW, AE5000-SW and AE6300-SW models, vertical terminal only is available.

Specifications	VTA-02-W	VTA-03-W	VTA-32-W
Application (breaker)	AE1000–AE1600-SW	AE2000–2500-SW	AE3200-SW
Shipping contents pieces	1	1	1
Order information Art. no.	168978	168979	168980

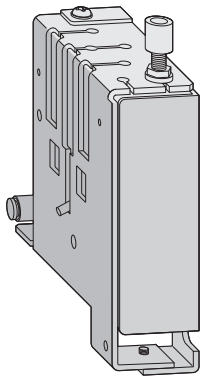
■ Front terminal adapter (FTA)



Front terminal adapters FTA allows a vertical connection for supply- and load-busbars.

Specifications	FTA-163F-W	FTA-164F-W	FTA-253F-W	FTA-254F-W	FTA-323F-W	FTA-324F-W	FTA-163D-W	FTA-164D-W	FTA-253D-W	FTA-254D-W	FTA-323D-W	FTA-324D-W
Application (breaker)	AE1000–AE1600-SW	AE1000–AE1600-SW	AE2000–AE2500-SW	AE2000–AE2500-SW	AE3200-SW	AE3200-SW	AE1000–AE1600-SW	AE1000–AE1600-SW	AE2000–AE2500-SW	AE2000–AE2500-SW	AE3200-SW	AE3200-SW
Pole	3	4	3	4	3	4	3	4	3	4	3	4
Typ	Fixed						Drawout					
Shipping contents pieces	6	8	6	8	6	8	6	8	6	8	6	81
Order information Art. no.	169331	169332	169333	169334	169335	169336	169337	169338	169339	169340	169341	169342

■ Mechanical interlock (MI)



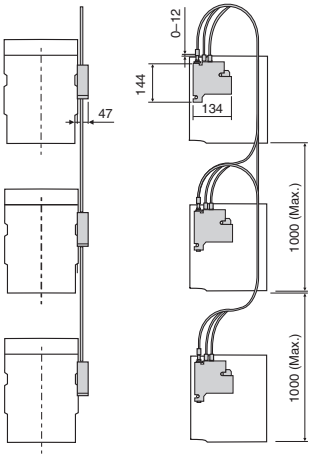
This is the device to prevent parallel charge of 2 or 3 units of breakers, and it can interlock the breakers mechanically without fail. All combinations are available among any models from AE1000-SW to AE4000-SWA.

Please apply for further details of AE4000-SW to AE6300-SW.

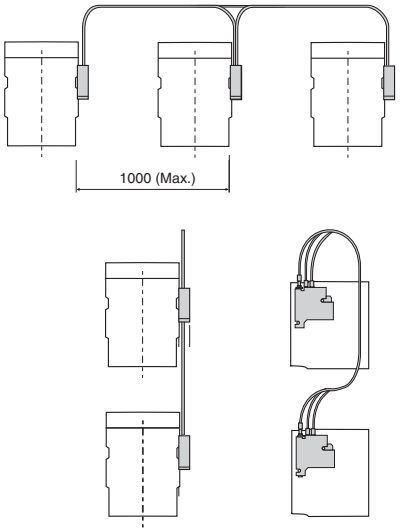
Further the interlock is possible among the different connection types or poles, such as fixed type or drawout type, 3 pole or 4 pole. In combination with electric interlock, the higher safety interlock system can be secured.

- In case of drawout type,the interlock works at "CONNECTED" position, and in another position the interlock is released, which is convenient for and easy maintenance and inspection of the breaker.
- When to turn OFF one breaker and then turn ON another breakers, please take an interval 0.5 seconds or more.
- MI for 3 breakers can not be installed to combine with Door Interlock (DI).

Vertical mounting



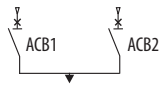
Horizontal mounting



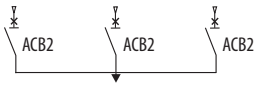
[mm]

Switching states (for 2 ACBs)

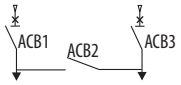
Type	①	②	③
ACB 1	○	|	○
ACB 2	○	○	|



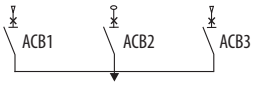
Type	①	②	③	④
ACB 1	○	|	○	○
ACB 2	○	○	|	○
ACB 3	○	○	○	|



Type	①	②	③	④	⑤	⑥	⑦
ACB 1	○	|	○	○	|	|	○
ACB 2	○	○	|	○	|	○	|
ACB 3	○	○	○	|	○	|	|

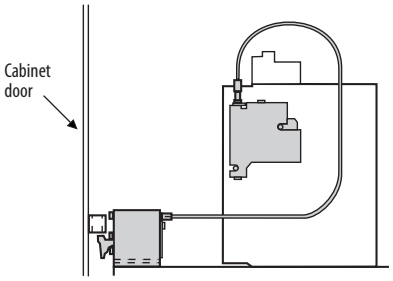


Type	①	②	③	④	⑤
ACB 1	○	|	○	○	○
ACB 2	○	○	|	○	○
ACB 3	○	○	○	|	|



Specifications		MI-203F-W	MI-204F-W	MI-403F-W	MI-404F-W	MI-203D-W	MI-204D-W	MI-403D-W	MI-404D-W	MI-IW-W
Application (breaker)		AE1000–1600-SW AE2000-SWA		AE2000–3200-SW AE4000-SWA		AE1000–1600-SW AE2000-SWA		AE2000–3200-SW AE4000-SWA		Wire set for all mechanical interlock devices required for combination of 3 ACBs
Breaker type		Fixed				Drawout				
Number of poles		3	4	3	4	3	4	3	4	
Order information	Art. no.	168963	168964	168965	168966	168967	168968	168969	168970	168971

■ Door interlock (DI)



This mechanical interlock device makes it impossible to open the panel door unless the circuit breaker is not switched off.

The device has been designed for panel doors with the groove on the left (standard). Locks for grooves on the right are available on request.

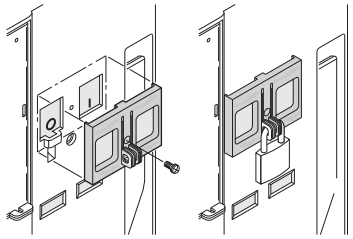
A wire-type mechanical interlock is used to allow flexibility in positioning breakers in the panel.

Note:

When using the door interlock (DI) the application of the mechanical interlock (MI) is not possible.

Specifications		DI-F-W	DI-D-W
Application (breaker)		For all breakers	For all breakers
Breaker type		Fixed	Drawout
Order information	Art. no.	168545	168546

■ Push button cover (BC-L)

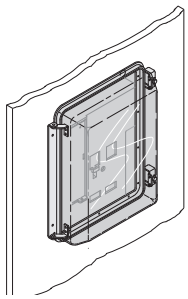


This mechanical device can be locked with a padlock or a seal (both is not included in the package) to protect the push buttons of the breaker unit against inadvertent ON/OFF operation.

The padlock has to be supplied by the customer.

Specifications		BCL-W
Material		Acrylic plate
Order information	Art. no.	168537

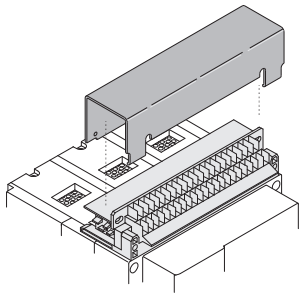
■ Dust cover (DUC)



The transparent dust cover is hinged onto the panel door. It has a screw lock and prevents dust and water entering into the circuit breaker.

Specifications		DUC-W
Material		IP 54
Order information	Art. no.	168960

■ Terminal cover (TTC)



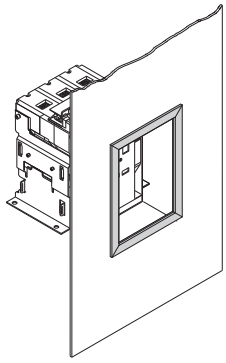
The terminal cover is a transparent cover for safety finger protection of control terminals.

The terminal cover prevents from careless touching to the live control terminals.

The TTC-F-W is included within the delivery of a fixed type AE-SW as standard.

Specifications		TTC-D-W	TTC-F-W
Application (breaker)		Dawout type	Fixed type
Protection		IP 20	IP 20
Order information	Art. no.	168549	168972 (Standard)

■ Door frame (DF)



The door frame improves the appearance, after cutting out the panel door to install the breaker.

Details on request.

Specifications		DUC-W
Application (Breaker)		For all breakers
Material		Plastic
Protection		IP 20
Order information	Art. no.	168960

■ Current transformer (CT)

These current transformers (CT and sensor coil) are suitable for the main conductor and the N conductor.

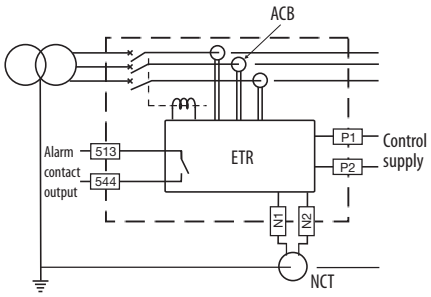
Current transformers of type CT-06□□□ serve the reduction of $I_{N\,max}$. on an AE1000.

Specifications		CT-06-W 025	CT-06-W 031	CT-06-W 050	CT-06-W 063	CT-10-W 100	CT-12-W 125	CT-16-W 160	CT-20-W 125	CT-20-W 160	CT-20-W 200	CT-25-W 250	CT-32-W 320
Application (breaker) ①		AE1000-SW	AE1000-SW	AE1000-SW	AE1000-SW	AE1000-SW	AE1250-SW	AE1600-SW	AE2000-SW	AE2000-SW	AE2000-SW	AE2500-SW	AE3200-SW
Rated current $I_{N\,max}$ ②	(A)	250	315	500	630	1000	1250	1600	1250	1600	2000	2500	3200
Order information	Art. no.	193939	193940	193941	193942	193943	193944	193945	193946	193947	193948	193949	193950

① Shipping contents includs CT and sensor coil for 1 pole. Other transformers on request.
② At 40 °C and 50/60 Hz

■ Neutral current transformer (NCT)

Block diagram with NCT function



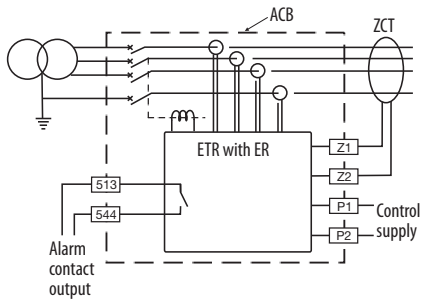
The neutral CT is used for ground fault protection when a 3 pole breaker is used on a 3 phase 4 wire system.

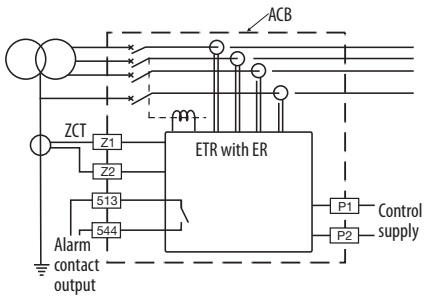
The Ground fault protection module type G1 should be used as optional setting module.

Specifications		NCT-06	NCT-10	NCT-12	NCT-16	NCT-20	NCT-25	NCT-32	NCT-40
Application (breaker)		AE630-SW	AE1000-SW	AE1250-SW AE2000-SW	AE1600-SW AE2000-SW	AE2000-SWA AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA
Current range	(A)	630	1000	1250	1600	2000	2500	3200	4000
Order information	Art. no.	168986	168987	168988	168989	168990	168991	168992	168993

■ External current transformer (ZCT/ZT)

Transformer ground wire method (ZCT)





This option is used to detect several amperes of earth leakage when used in combination with an electronic trip relay that has the earth leakage tripping (ER) option.

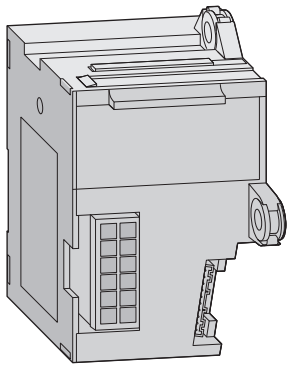
Two methods are available:

- ZCT: three-load phase conductors (and the neutral conductor in a 4-wire system) are passed through the ZCT
- ZT: The other method uses a smaller ZCT (only supply transformer ground wire passes through to earth.

Specifications		ZCT-163-W	ZCT-323-W	ZCT-324-W	ZT-15B-W	ZT-30B-W	ZT-40B-W	ZT-60B-W	ZT-80B-W	ZT-100B-W
Application		Load circuits			Transformer ground wire					
Hole diameter for wire ①	(mm)	230x60 (oval)	370x108 (oval)	500x108 (oval)	Ø 15	Ø 30	Ø 40	Ø 60	Ø 80	Ø 100
Order information	Art. no.	168994	168995	168996	168997	168998	168999	169000	169001	169002

① Further details on request.

■ Internal power supply units (PW)

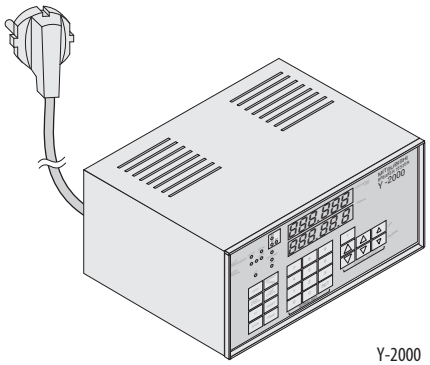


These power supplies are used for supplying the ETR base unit. They are equipped with 6 outputs (alarms and errors).

The PW3-W is included as standard power supply in the ACB's.

Specifications		PW3-W	PW4-W	PW5-W
Power supply	(V)	100–240 (AC) 100–125 (DC)	24 – 60 (DC)	100 – 240 (DC)
Output contacts		6	6	6 (SSR)
Order information	Art. no.	168985 (standard)	168562	168563

■ Field test device (Y-2000)

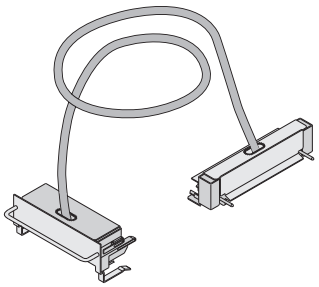


Y-2000

The electronic trip relay can be checked by this field test device when the breaker is at test or disconnect position. So it allows you to test the trip relay without the breaker being connected to the main supply. The breaker will trip when tested.

Specifications	Y-2000
Power supply	100–240 V AC, 50/60 Hz
Test functions	LTD, INST, STD, Ground fault, pre-alarm
Test current signal setting	Continuously variable (10 – 2500 %)
Others	Ammeter, time counter
Order information Art. no.	27496

■ Test jumper (TJ)



With the breaker taken out of its cradle, this device enables the breaker to be electrically opened and closed, and the operating sequence to be checked.

3 m length of cable is equipped as standard. Other lengths available on request.

Specifications		Test Jumper
Cable length	(m)	3 ①
Order information	Art. no.	168977

① Other lengths on request

■ Interphase barriers

Connections		AE1000-SW – AE1600-SW	AE2000-SWA	AE2000-SW – AE3200-SW	AE4000-SWA
Fixed type	Horizontal (FIX)	●	×	●	×
	Vertical terminal (FIX-VT)	×	▲	×	▲
	Vertical terminal adaptor (VTA)	▲	×	▲	×
	Front terminal adaptor (FIX-FTA)	▲	×	▲	×
Drawout type	Horizontal (DR)	●	×	●	×
	Vertical terminal (DR-VT)	●	▲	▲	▲
	Front terminal (DR-FT)	—	×	▲	×
	Vertical terminal adaptor (VTA)	▲	×	▲	×
	Front terminal adaptor (DR-FTA)	▲	×	▲	×

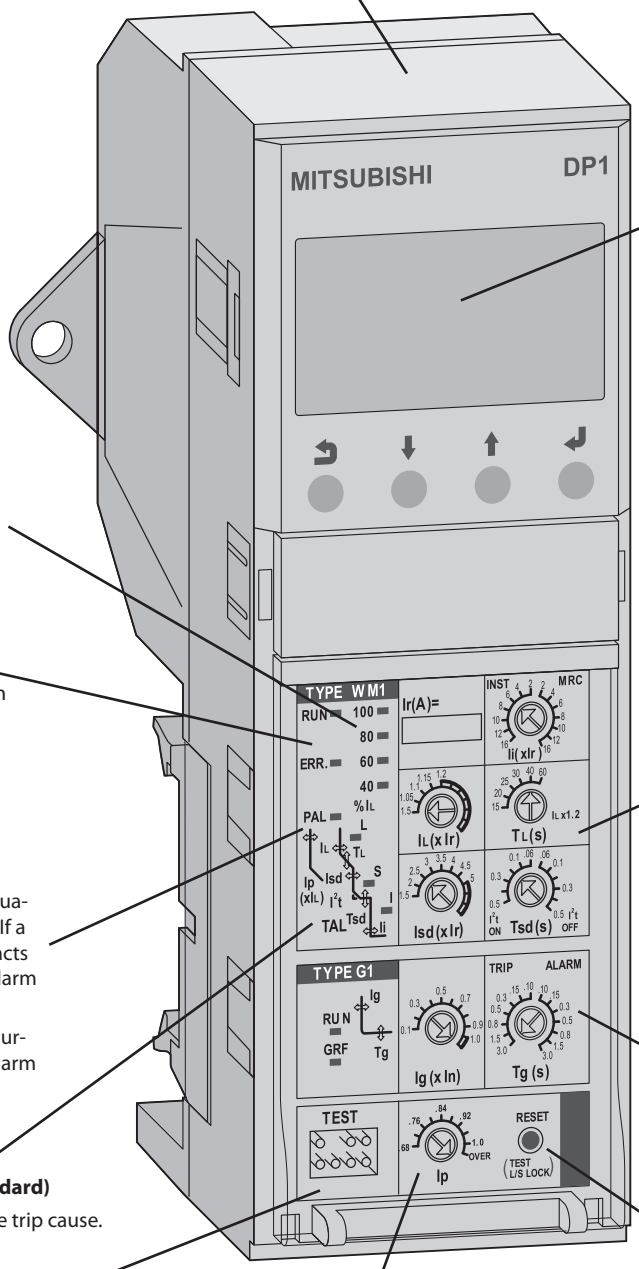
● = Available for the insulation ▲ = Available for separating terminals × = Not existing type — = Attachment is impossible
For AE4000-SW to AE6300-SW not available

Introduction and selection

Power supply module

This module provides control source for Display module, Trip indicator and several indicators (LEDs). (Even when the control power source is off, the function of over current protection and ground fault protection are effective.)

The power supply modules provide 6 output contacts for external use (see page 22).



Display

Several measuring data (current, voltage, power etc) and alarms can be displayed with this module. (see page 28)

Load current LED (standard)

This indicator displays the ETR situation (Run or Error)

RUN LED, ERR. LED (standard)

This indicator displays the ETR situation (Run or Error)

Main setting module

This module provides the function of over current protection. It is possible to select the two setting modules according to application (see page 24).

Neutral protection of rated current (100 %) function is standard at 4 pole breaker.

Pre-alarm (PAL) (standard)

This indicator displays the Pre-alarm situation when the setting current exceeds. If a power supply module with alarm contacts is installed, the output contact of Pre-alarm is available.

*The output is reset when the electric current goes below the set level after an alarm is set off

Optional setting module (option)

(figure shows G1)

Additional functions and characteristics can be selected by optional setting modules (see page 26).

Trip indicator LED (standard)

This indicator displays the trip cause.

TEST terminal (standard)

This terminal already installed as standard and is used for checking by the field test device Y-2000.

Pre-alarm current level setting dial (standard)

For setting the current level for Pre-Alarm. If current exceeds this level, pre-alarm is indicated.

RESET button (standard)

When push this reset button, trip indicator, and Pre-Alarm will be reset. And when the instantaneous test by field test device Y-2000 (optional) and push this reset button, as a result of LTD and STD function become ineffective.

Standard functions

■ OCR alarm (AL)

When it happens to trip by over current, ground fault (GFR) or Earth leakage (ER), this function issues a warning alarm.

■ Neutral pole overcurrent protection (NP)

When harmonics in load current are large, the current on neutral pole exceeding rated current may flow. Harmonics may cause some troubles.

Neutral pole overcurrent protection prevents them by operating at 100% of rated current on neutral pole. Please see page 27 for 50 % neutral protection.

Special functions – optional

■ MCR: Making current release

Just under the breaker closing operation (from open to close), Instantaneous characteristic become effective, but after closing the breaker, instantaneous characteristic become ineffective.

When you order the MCR switch, MCR switch is built in the main body. If MCR switch is built in the main body and the adjust dial of INST/MCR on main setting module is set the MCR position, MCR function become effective (see page 27).

■ NCT

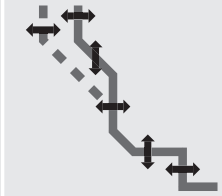
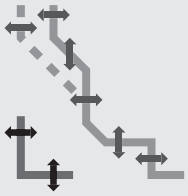
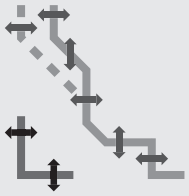
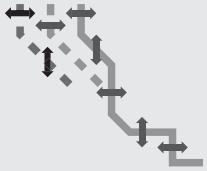
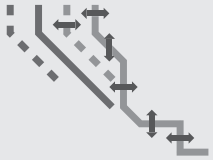
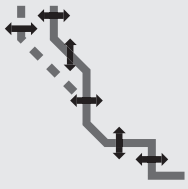
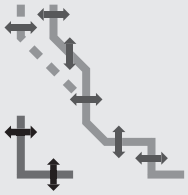
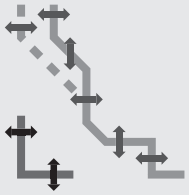
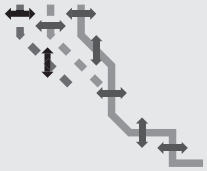
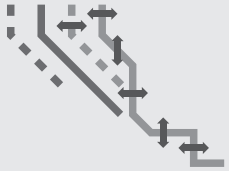
Neutral CT is required for Ground fault or Neutral pole protection, when 3 pole breaker is used for 3 phase 4 wires system. (see page 18)

■ ZCT

ZCT is required for a few amperes earth leakage protection, and is combining ER plug.
(see page 18)

Characteristic table

Overview of tripping characteristics of main setting modules in combination with optional setting modules

	General protection Main setting module only	G1 Ground fault	E1 Earth leakage	AP 2nd additional Pre-alarm	N5 Neutral pole 50% protection
WS General use LTD+STD+INST/MCR					
WM Generator protection use LTD+STD+INST/MCR					

Note:
WB type for special use is available on request.

Power supply modules

Product overview

Type	Rating	Alarm output contacts
P3	100–240 V AC 100–125 V DC	6 output contacts
P4	24–60 V DC	6 output contacts
P5	100–240 V AC	6 output contacts (SSR)

Note:
Over current protection and ground fault protection operates without control power source.

Contact capacity (Type code P3, P4)

Voltage (V)		Resistive load cosφ = 1.0	Inductive load cosφ = 4.0 L/R = 7 ms
AC	240	1 A	0.5 A
	120	1 A	1 A
DC	125	0.1 A	0.05 A
	30	1 A	1 A

Contact capacity (Type code P5)

Voltage (V)		Normal current	Peak inrush current	ON resistance (max.)
AC	240	0.1 A	0.3 A	5 Ω
	120	0.1 A	0.3 A	5 Ω
DC	125	0.1 A	0.3 A	5 Ω
	30	0.1 A	0.3 A	5 Ω

Factory setting of 6 output contacts is as follows.

G1/E1/AP	LTD	STD/INST	PAL	TAL	ERR
Refer to lower table	Self-holding	Self-holding	Non Self-holding	Non Self-holding	Non Self-holding

Type	G1	E1	AP
TRIP side	Selfholding	Selfholding	—
ALARM side	Non Self-holding	Non Self-holding	Non Self-holding

Description:
Self-holding type: The output condition is held until it is reset.
Non self-holding type: The output is reset if it is returned to the normal condition.

CT rating table

AE1000-SW		AE1250-SW	AE1600-SW	AE2000-SWA	AE2500-SW	AE3200-SW	AE4000-SWA	AE5000-SW	AE6300-SW
1000 A		1250 A	1600 A	2000 A	2500 A	3200 A	4000 A	5000 A	6300 A
250 A	315 A			AE2000-SW			AE4000-SW		
500 A	630 A			2000 A			4000 A		
				1250 A	1600 A				

Notes:
– AE1000-SW and AE2000-SW has low rating types, too.
– As for details of ratings, refer to pages 6 and 7.

Electronic trip relay (ETR configuration overview)

Main setting module

WS1, WM1	AE1000–1600-SW, AE2000–3200-SW, AE4000-SW
WS2, WM2	AE2000-SWA, AE4000-SWA, AE5000-SW
WS3, WM3	AE6300-SW

WS : General use
WM: Generator protection use
(WB: Special use: on request)

Optional setting module

G1: Ground fault protection
N5: Neutral pole 50 % protection
E1: Earth leakage protection
AP: 2nd Additional Pre-alarm

Power supply

P3: AC 100–240 V / DC100–125 V with output contact
P4: DC 24–60 V with output contact
P5: DC 100–240 V with output contact (SSR)

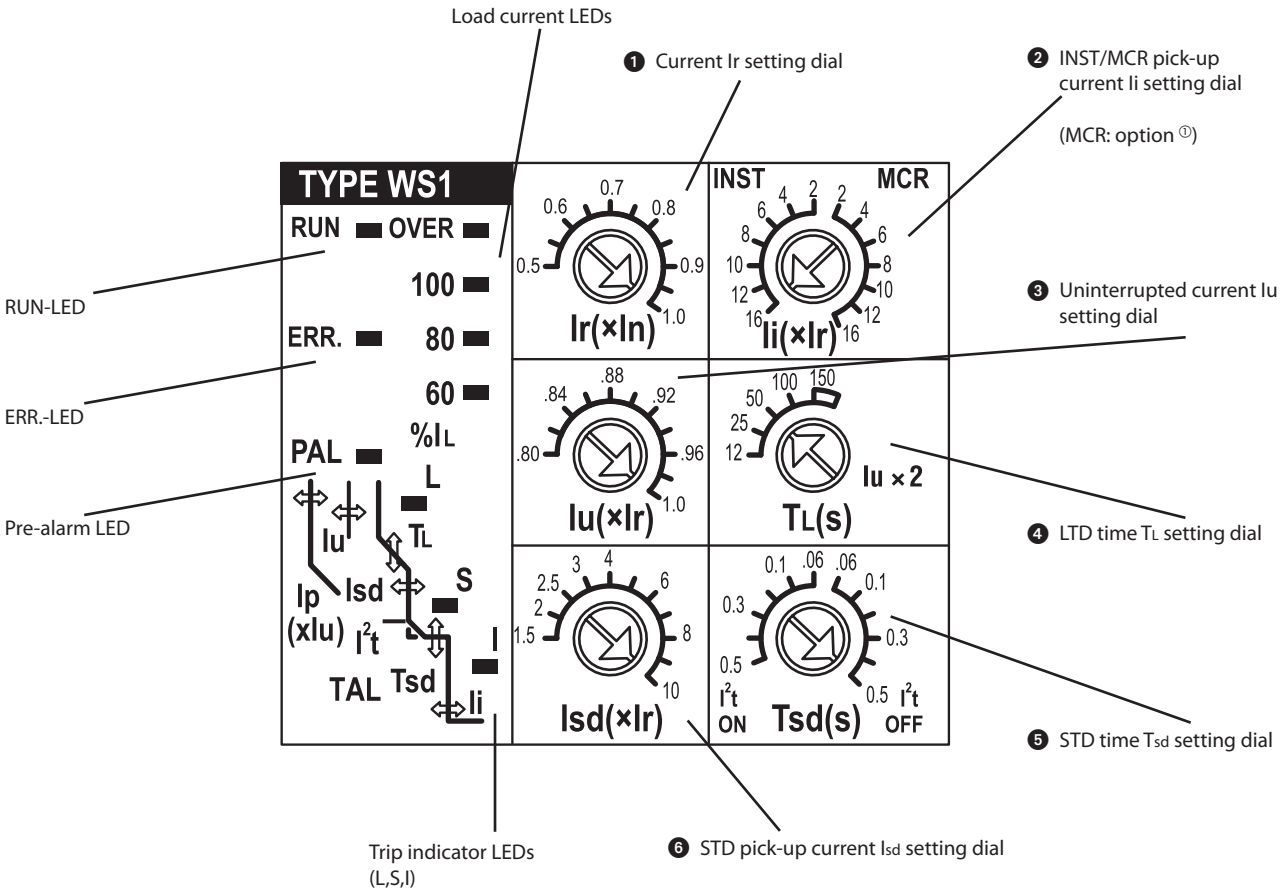
Additional function

- ■ Extension module (EX1)
  - ■ Display (DP1)
  - ■ Display onto panel board (DP2)
  - ■ VT-W unit
- Network
  - ■ BIF-CC
  - ■ BIF-PR
  - ■ BIF-MD
- ■ MCR switch (MCR-SW)

The assignment of the contacts can be changed with DP1/DP2.

The output of G1/E1/AP/PAL OUT can also be changed to the self-holding type from the non self-holding type.

S Types – General Protection



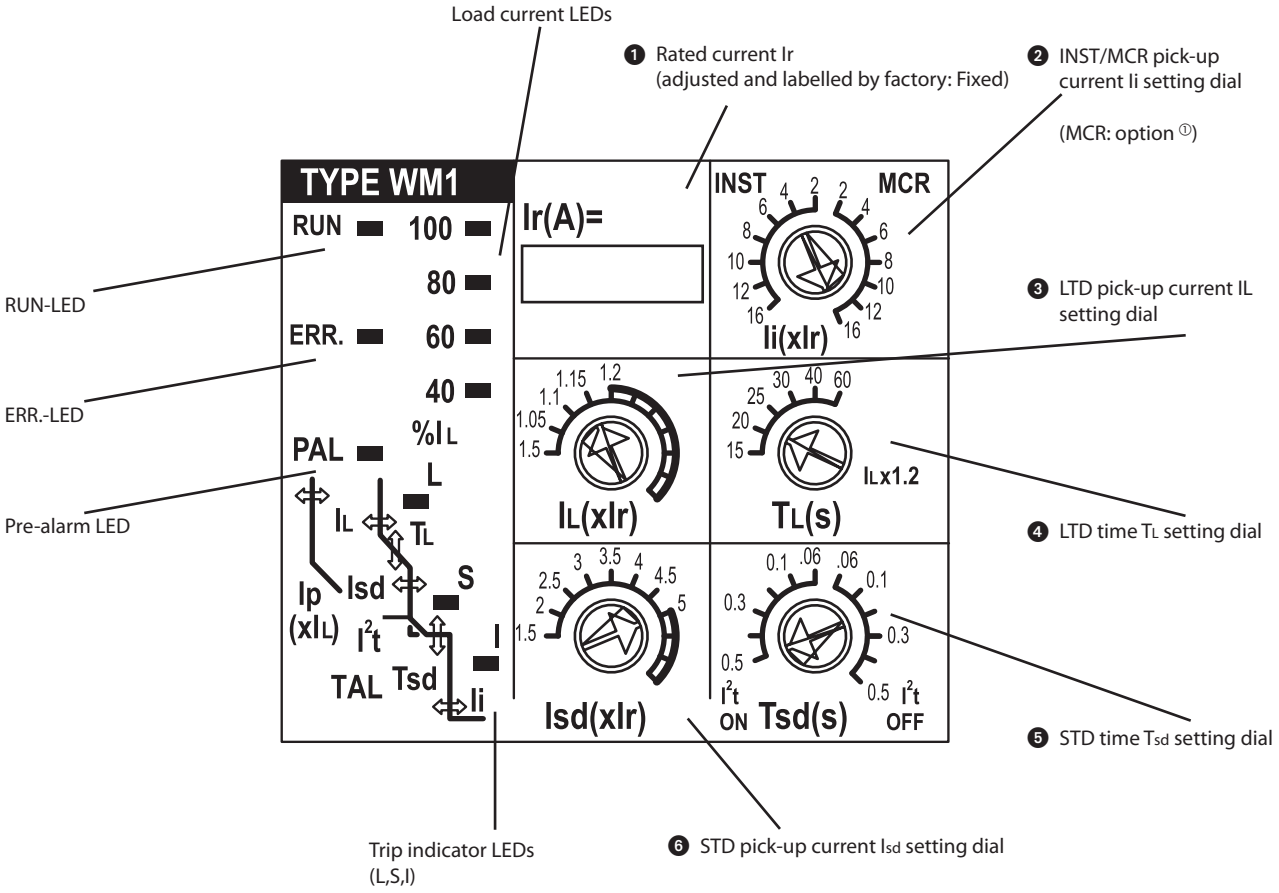
Adjustable setting range

No.	Setting item		Adjustable setting range			Accuracy	Setting for shipment
❶	Current setting	Ir	0.5 – 1.0 (0.05 step) x In (CT rating)			—	**1.0**
❸	Uninterrupted current	Iu	0.8 – 1.0 x Ir (0.02 step), Pick-up current: 1.15 x Iu			1.05 x Iu…Non Pick-up 1.25 x Iu…Pick-up	**1.0**
❹	LTD time	TL	12–25–50–100–150 s at Iu x 2			± 20%	**150**
❻	STD pick-up current	Isd	1.5–2–2.5–3–4–5–6–7–8–9–10 x Ir			± 15%	**10**
❺	STD time	Tsd	0.5–0.4–0.3–0.2–0.1–0.06 – 0.06–0.1–0.2–0.3–0.4–0.5 s (I²t ON) (I²t OFF) at Isd x 1.5			± 20% This means, it operates in the range between 0.04 and 0.08 s when the time set at 0.06 s.	**0.5 (I²t** ON)
❷	INST/MCR pick-up current	Ii	AE1000-SW–AE1600-SW AE2000-SW–AE3200-SW AE4000-SW	WS1	16–12–10–8–6–4–2 – 2–4–6–8–10–12–16 x Ir (INST) (MCR) ①	± 15%	**WS1: 16** (INST)
			AE2000-SWA, AE4000-SWA AE5000-SW	WS2	12–10–8–6–4–2 – 2–4–6–8–10–12 x Ir (INST) (MCR) ①		**WS2: 12** (INST)
			AE6300-SW	WS3	10–8–6–4–2 – 2–4–6–8–10 x Ir (INST) (MCR) ①		**WS3: 10** (INST)
	Pre-alarm current	Ip	Iu x 0.68 – 1.0 (0.04 step) – OVER			± 10%	**OVER** ②
	Pre-alarm time	Tp	1/2 TL (after 1/2 TL, PAL contact output turns on.)			± 20%	—

① Upper figure and table include optional MCR function.
② Pre-alarm current "OVER" setting is equal to 1.0.

Specifications	WS1-W	WS2-W	WS3-W
Main setting Module S type	WS1	WS2	WS3
Order information Art. no.	168552	168553	205180

M Types – Generator Protection



Adjustable setting range

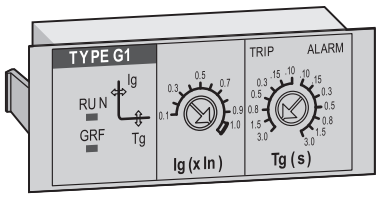
No.	Setting item		Adjustable setting range			Accuracy	Setting for shipment
❶	Current setting	Ir	0.63 – 1.0 x In (Adjust by factory: Fixed)			—	Specify when ordering
❸	ULTD pick-up current	IL	1.0–1.05–1.1–1.15–1.2 x Ir			± 5%	**1.0**
❹	LTD time	TL	115–20–25–30–40–60 s at IL x 1.2			± 20%	**150**
❻	STD pick-up current	Isd	1.5–2–2.5–3–3.5–4–4.5–5 x Ir			± 15%	**10**
❺	STD time	Tsd	0.5–0.4–0.3–0.2–0.1–0.06 (I2 t ON) – 0.06–0.1–0.2–0.3–0.4–0.5 s (I2 t OFF) at Isd x 1.5			± 20% This means, it operates in the range between 0.04 and 0.08 s when the time set at 0.06 s.	**0.5 (I^2t** ON)
❷	INST/MCR pick-up current	Ii	AE1000-SW–AE1600-SW AE2000-SW–AE3200-SW AE4000-SW	WM1	16–12–10–8–6–4–2 (INST) – 2–4–6–8–10–12–16 x Ir (MCR) ①	± 15%	**WM1: 16** (INST)
			AE2000-SWA, AE4000-SWA AE5000-SW	WM2	12–10–8–6–4–2 (INST) – 2–4–6–8–10–12 x Ir (MCR) ①		**WM2: 12** (INST)
			AE6300-SW	WM3	10–8–6–4–2 (INST) – 2–4–6–8–10 x Ir (MCR) ①		**WM3: 10** (INST)
	Pre-alarm current	Ip	Iu x 0.68 – 1.0 (0.04 step) – OVER			± 5%	**OVER** ②
	Pre-alarm time	Tp	1/2 TL (after 1/2 TL, PAL contact output turns on.)			± 20%	—

① Upper figure and table include optional MCR function.
② Pre-alarm current "OVER" setting is equal to 1.0.

Specifications	WM1-W	WM2-W	WM3-W
Main setting Module S type	WM1	WM2	WM3
Order information Art. no.	168552	168553	205180

Note:
WB type for special use is available on request.

■ Ground fault protection (GFR)



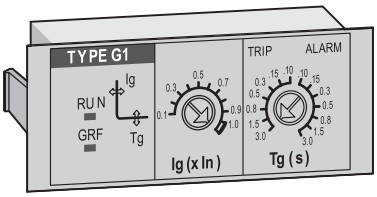
The ground fault protection (GFR) of several hundred amperes is possible.

This function can be selected for trip and alarm (no trip). Power supply is necessary for this function, even if there is not power supply, it can function at 0.2 x In or higher.

Specifications	G1-W
Optional setting Module	G1 (Ground fault protection module)
Order information Art. no.	168558

Setting item		Adjustable setting range	Accuracy	Setting for shipment
GFR pick-up current	Ig	0.1–0.2–0.3–0.4–0.5–0.6–0.7–0.8–0.9–1.0 x In	±20%	**1.0**
GFR time	Tg	3–1.5–0.8–0.5–0.3–0.15–<0.1 (TRIP) – <0.1–0.15–0.3–0.5–0.8–1.5–3 (ALARM) s (at 1.5 x Ig)	±20%	**3 s (TRIP)**

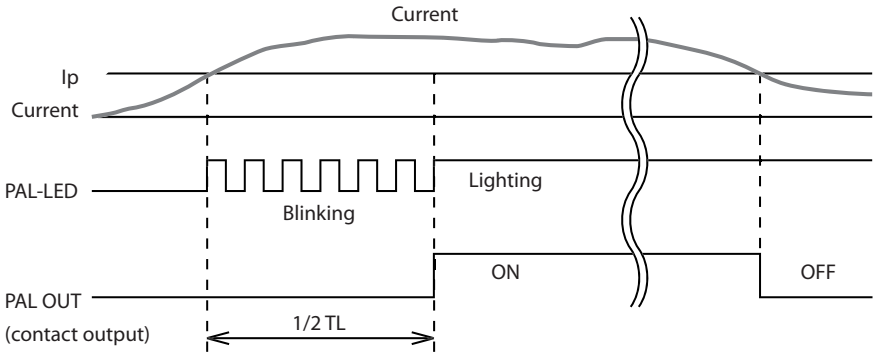
■ 2nd Additional Pre-alarm (AP)



The Pre-Alarm (1st) function already installed in standard ETR, the 2nd additional Pre-Alarm function can be installed as option, thereby it is possible to monitor (observer) electric circuit in more detail by 2nd additional Pre-Alarm function.

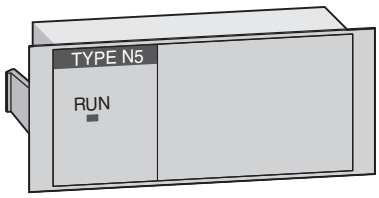
Specifications	AP-W
Optional setting Module	AP (2nd Pre-alarm module)
Order information Art. no.	168560

Pre-alarm timing chart



Setting item		Adjustable setting range	Accuracy	Setting for shipment
2nd additional Pre-alarm pick-up current	Ip2	0.5–0.6–0.7–0.8–0.84–0.88–0.92–0.96–1.0 x Iu (WS) 0.5–0.6–0.7–0.8–0.84–0.88–0.92–0.96–1.0 x IL (WM)	±10% (WS) ±5% (WM)	1.0
2nd additional Pre-alarm time	Tp2	3–1.5–0.8–0.5–0.3–0.15–<0.1 (TRIP) – <0.1–0.15–0.3–0.5–0.8–1.5–3 (ALARM) s (at 1.5 x Ig)	±20%	0.9 x TL

■ Neutral pole 50% protection (N5)

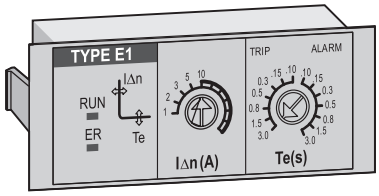


Neutral pole overcurrent protection (operating at 100% of rated current) already installed in standard ETR.

But if you would like to operates at 50% of rated current on neutral pole, neutral pole 50% protection realizes it.

Specifications	N5-W
Optional setting Module	N5 (Neutrale pole protection module)
Order information Art. no.	168561

■ Earth leakage protection (ER)

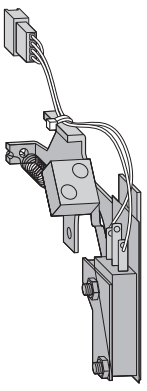


By combining the ETR with earth leakage protection (ER) and External ZCT, earth leakage protection is possible. Earth leakage protection, earth leakage tripping and earth leakage alarm can be selected. Control supply is necessary for this function.

Specifications	E1-W
Optional setting Module	E1 (Neutrale pole protection module)
Order information Art. no.	168559

Setting item		Adjustable setting range	Accuracy	Setting for shipment
ER pick-up current	IΔn	1–2–3–5–10 A	+0% –30%	10 A
ER time	Te	3–1.5–0.8–0.5–0.3–0.15–<0.1 (TRIP) – <0.1–0.15–0.3–0.5–0.8–1.5–3 s (ALARM) (at 1.5 x Iin)	±20%	3 s (TRIP)

■ MCR switch (MCS-W)

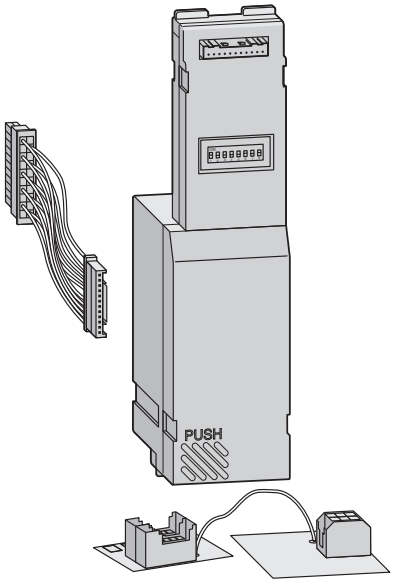


If MCR switch is built in the breaker and the dial for INST/MCR on Main setting module is set to any MCR position, MCR function is operative.

MCR function: During a closing operation of the breaker, Instantaneous characteristics is operative. And it becomes inoperative when the breaker is in the closed position.

Specifications	MCS-W
Optional setting Module	MCR
Order information Art. no.	168570

■ Extension module (EX1)



This is the module that realizes various additional functions combining Display module (DP1/DP2), Interface unit (BIF-CC/ BIF-PR/BIF-MD) and VT-W unit.

- **Various measuring elements, high measuring accuracy**

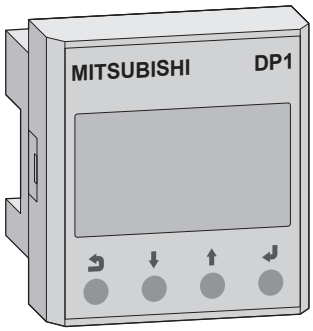
  By adopting high-performance ASIC, various measuring elements (load current, voltage, energy,harmonics, etc.) and high measuring accuracy are realized.

- **Communication function**

  2 display modules and 1 interface unit can be connected simultaneously by internal communication.

Setting item		Adjustable setting range
Type		Extension Module
Order information	Art. no.	168564

■ Display module (DP1/DP2)



This is the module that displays and sets various information, for example, measurement, trip and alarm, setting of output contacts and so on.

- **Multi display of measuring element**

  It enables to easily monitor the comparison of each measuring element by multi display (load current 4 phases multi display and voltage multi display) on one screen.

- **2-colours back light**

  If trip or alarm occurred, back light colour changes from green to red automatically.

- **Graphical display**

  By adopting dot matrix type LCD, graphical display such as bar graph display of load current, harmonic currents and characteristic curve are realized.

There are 2 types of this module. One is the ETR attachment type (DP1). Another is the panel attachment type (DP2) and is connected to extension terminals of control circuit by 2 m cable (5 m cable will be available on request).

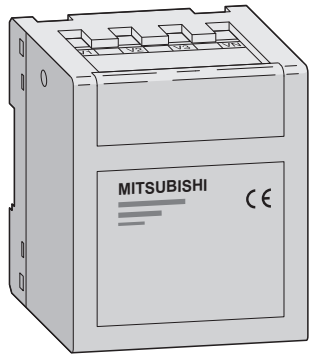
Spedification		DP1-W	DP2-W
Type		Display module for ETR assembly	Display module for Panel assembly
Order information	Art. no.	168565	168566

Notes:

– Extension module (EX1) is required.

– The VT-W measurement module is required to display the measured data except the electric current.

■ Measurement module (VT-W)

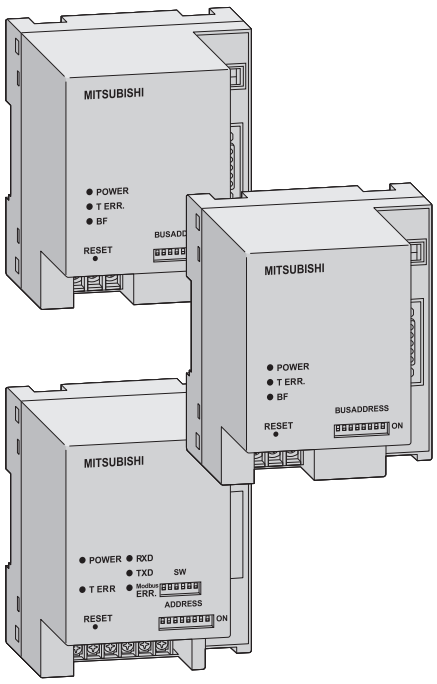


The VT-W measurement module enables to measure voltages, powers, energies, harmonic currents and etc. by connecting the ETR with Extension module (EX1).

It is to be placed separatetly outside the the breaker. A connection cable of 2 meters length is included.

Specifications		VT-W
Unit for		U/P/E/cos phi/earth leakage/average measuring/trip history/trip current measuring
Order information	Art. no.	168567

■ Interface unit (BIF-CC/BIF-PR/BIF-MD)



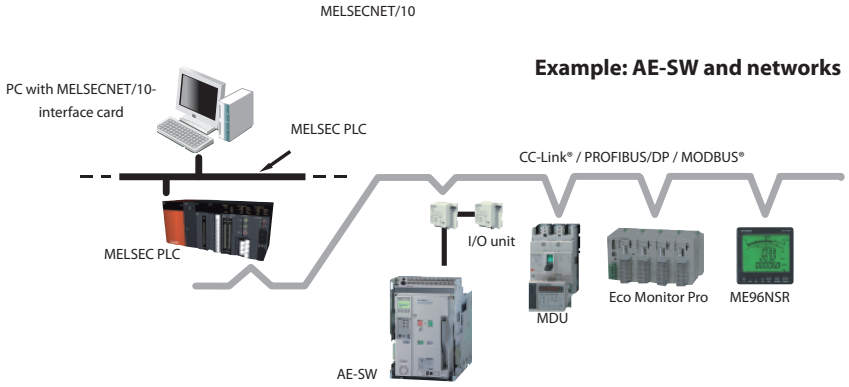
These Interface units can expand the future possibility in various communication and Intelligent control.a

- **Applicable to various open networks.**

  These units are applicable to various open network systems such as CC-Link®, PROFIBUS/DP and MODBUS® (RS-485), which can be built in easily.

- **Intelligent control by Multi-data communication**

  It comes into being the Intelligent control by Multi-data communication through these interface units to PLC/SCADA, which transfer the measurement information, setting values, error information and trip and alarm information.



Example: AE-SW and networks

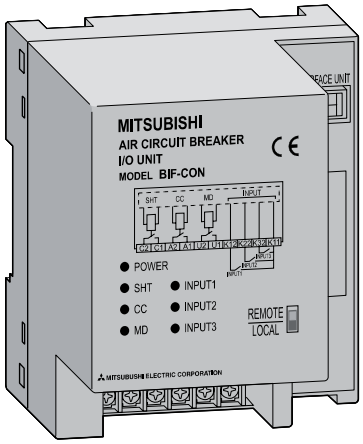
Specifications		BIF-CC-W	BIF-PR-W	BIF-MD-W
Main setting Module S type		CC-Link network	PROFIBUS/DP network	Modbus network
Order information	Art. no.	168571	168572	168573

Note:

– Extension module (EX1) is required.

– The VT-W unit is required to display the measured data except the electric current.

■ I/O unit (BIF-CON/BIF-CL)



The input & output controlling unit BIF-CON is available for the remote controlling and remote monitoring of the breaker condition through the various network systems.

With this BIF-CON in addition to the interface unit, it become possible to control the breaker remotely, like a ON or OFF operations or Spring-charging.Further, by combining the drawout position switch (BIF-CL), the monitoring of drawout position become available in case of the breaker drawout type.

Function	Description	Note
Control	Breaker ON operation	1 a contact for CC
	Breaker OFF operation	1 a contact for SHT (not applicable for AC 380 – 500 V rating)
	Spring charge	1 a contact for MD
Monitor	Digital Input (DI) monitoring	In case of BIF-CC and BIF-MD, max.3 contacts monitoring are available. In case of BIF-PR, 1 contact monitoring is available.
	Breaker drawout position	Position: CONNECTED, TEST and DISCONNECTED BIF-CL is required.

Specifications		BIF-CON-W
Application		I/O unit network module
Order information	Art. no.	168574

Configuration table of ETR with EX1 and VT-W module

Combination sample	Display module + Extension module								Display module + Extension module + VT-W unit							
Type	❶ = EX1 ❷ = DP1 – ❸ = DP2 ①								❶ = EX1 ❷ = DP1 – ❸ = DP2,VT-W ①							
❶ Main setting module	WS				WM				WS				WM			
❷ Optional setting module	NP	AP	G1	E1	NP	AP	G1	E1	NP	AP	G1	E1	NP	AP	G1	E1
❸ Power supply	P3 – P5								P3 – P5							
Load current (±2.5 %)				○								○				
Leakage current (±15 %) 3	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○
Voltage (±2.5 %)				—								○				
Power (active, reactive, apparent) (±2.5 %)				—								○				
Power factor (±5 %)				—								○				
Energy (active, reactive) (±2.5 %)				—								○				
Harmonics current (±2.5 %)				—								○ (3.5 ... 19th)				
Frequency (±2.5 %)				—								○				
LTD		○				○				○				○		
STD		○				○				○				○		
INST				○								○				
GFR	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—
ER	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○
UVT				○ ②								○ ②				
PAL1				○								○				
PAL2	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—
OVER				○								○				
GFR	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—
EPAL	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○
ER	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○
LTD		○				○				○				○		
STD		○				○				○				○		
INST				○								○				
PAL1				○								○				
PAL2	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—
GFR	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—
EPAL	—	—	—	●	—	—	●	—	—	—	—	●	—	—	—	●
ER	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○
Output contacts setting change				●								●				
Date & Time				●								●				
Demand time				●								●				
Alarm holding method				●								●				
Trip and alarm information				●								●				
Measurement information (min. and max. values)				●								●				
Main / Optional setting module information				○								○				
Error information				○								○				
CT rating				○								○				
Phase line method				○								○				
Normal connection or reverse connection				○								○				

○: can be displayed by DP1/DP2 ●: can be displayed and set by DP1/DP2

① 2 units of display modules can be attached.

② Display is available only when UVT module is attached.

③ Included the accuracy of ZCT.